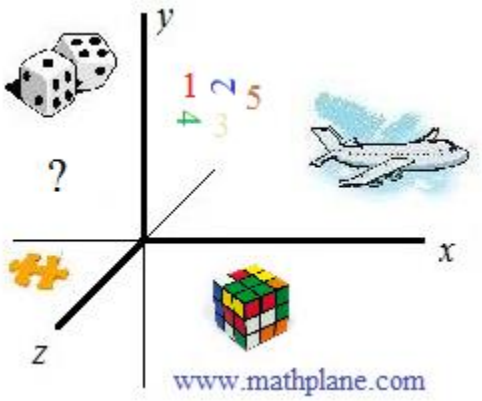
2012 Puzzle

(….and, a solution)



2 0 1 2

Using 2, 0, 1, 2, and any combination of mathematical symbols/operations, write equations that compute to every number between 1 and 25.
(mathplane solution: 11 minutes)

Note: Each digit must be used exactly once!

Examples:

0 $= 0 \times 212$
$= 2/2 - \sqrt{1} + 0$
$= 2^1 - 2 + 0$

1

2

3

4

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Some hints are on the following page….

Some suggested Hints:

Factorials: 0! = 1

Logarithms: log10 = 1

Greatest Integer Function: rounds a number down to the next integer.

Ex: [[3.6]] = 3

Decimals in the denominator: multiplication

Ex: 1/.2 = 1 x 5 = 5

Least integer function: rounds a number UP to the next integer.

Ex: Least integer function of 3.2 is 4

Square roots: Square root of 2000 is approximately 45

Square root of 1000 is approximately 32

SOLUTIONS on the next page…

2012

Using 2, 0, 1, 2, and any combination of mathematical symbols/operations, write equations that compute to every number between 1 and 25.
(mathplane solution: 11 minutes)

Note: Each digit must be used exactly once!

Examples:

0 $= 0 \times 212$
$= 2/2 - 1 + 0$
$= 2^1 - 2 + 0$

1 $= (2 - 1) + (0 \times 2)$

2 $= 2^1 + (0 \times 2)$

3 $= \frac{10}{2} - 2$

4 $= 2^2 - (1 \times 0)$

5 $= 2 + 0 + 1 + 2$

6 $= 10 - 2^2$

7 $= \frac{10}{2} + 2$

8 $= 20 - 12$

9 $= 10 - \frac{2}{2}$

10 $= 10 + (2 - 2)$

11 $= 12 - 2^0$

12 $= 22 - 10$

13 $= 12 + 2^0$

14 $= 10 + 2^2$

note: using the greatest integer function $\lfloor \sqrt{20} \rfloor = 4$

15 $= \lfloor \sqrt{20} \rfloor^2 - 1$

16 $= (2 + 2)^{(1 + 0!)}$ (note: 0! = 1)

17 $= \lfloor \sqrt{20} \rfloor^2 + 1$

18 $= (1 + 2)! \, (2 + 0!)$ (note: 3! = 3 x 2 x 1 = 6)

19 $= 21 + 0 - 2$

20 $= 22 - 1 - 0!$

21 $= 21 + (2 \times 0)$

22 $= 22 + (1 \times 0)$

23 $= \log 10 + 22$ (note: log 10 = 1)

24 $= (2 + 2)! + (0 \times 1)$

25 $= \left(\frac{10}{2}\right)^2$

***Challenge: Using the same rules, can you write equations that compute to every number between 26 and 50?

2 0 1 2

Using 2, 0, 1, 2, and any combination of mathematical symbols/operations, write equations that compute to every number between 26 and 50.
(mathplane solution: approx 1 hr. 45 min)

Note: Each digit must be used exactly once!

Examples:

0 $= 0 \times 212$
$= 2/2 - \sqrt{1} + 0$
$= 2^1 - 2 + 0$

26 $= 20 + (1 + 2)!$

27 $= (0! + 2)^{(1+2)}$

28 $= 2 \cdot \lfloor \sqrt{210} \rfloor$ (note: $\sqrt{210} \cong 14.5$ and, using greatest integer function: $\lfloor 14.5 \rfloor = 14$)

29 $= \left\lfloor \left(\frac{0!}{.2} \right)^{2.1} \right\rfloor$ (note: $5^{2.1} \cong 29.4$)

30 $= (2 + 0!)!\ (1/.2)$ (note: $1/.2 = 5$, $2 + 0! = 3$, then, $3! = 6$)

31 $= 2^{\left(\frac{1}{.2}\right)} - 0!$ (note: $1/.2 = 5$ and, $2^5 = 32$)

32 $= 20 + 12$

33 $= 2^{\left(\frac{1}{.2}\right)} + 0!$

34 $= (2 + 2)! + 10$

35 $= \lceil \sqrt{1220}. \rceil$ (note: $\sqrt{1220}. \cong 34.93$)

36 $= (2 + 0!) \times 12$

37 $= \lceil 20^{(1.2)} \rceil$ (note: $20^{(1.2)} \cong 36.4$)

38 $= (20 - 1) \times 2$

39 $= (20 \times 2) - 1$

40 $= 1 \times 2 \times 20$

41 $= (2 \times 20) + 1$

42 $= 2 \times 21 + 0$

43 $= 2 \times 21 + 0!$

44 $= 22 \times (0! + 1)$

45 $= \lceil \sqrt{2012}. \rceil$ (note: $\sqrt{2012}. \cong 44.86$ and, using least integer function, $\lceil 44.86 \rceil = 45$)

46 $= \lfloor \sqrt{2120} \rfloor$ (note: $\sqrt{2120} \cong 46.04$ and, using least/greatest integer functions get 47/46)

47 $= \lceil \sqrt{2120}. \rceil$

48 $= 10/.2 - 2$

49 $= ((1 + 2)! + 0!)^2$ (note: $3! = 6$ $0! = 1$)

50 $= 10^2 \div 2$

Thanks for visiting!

If you have questions, suggestions, or requests, let us know.